General

Guideline Title

Stroke. Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA).

Bibliographic Source(s)

National Collaborating Centre for Chronic Conditions. Stroke. Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA). London (UK): National Institute for Health and Clinical Excellence (NICE); 2008 Jul. 37 p. (Clinical guideline; no. 68).

Guideline Status

This is the current release of the guideline.

The National Clinical Guideline Centre for Acute and Chronic Conditions reaffirmed the currency of this guideline in 2011.

Recommendations

Major Recommendations

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Collaborating Centre for Chronic Conditions (NCC-CC) on behalf of the National Institute for Health and Clinical Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance.

Rapid Recognition of Symptoms and Diagnosis

There is evidence that rapid treatment improves outcome after stroke or transient ischemic attack (TIA). The recommendations in this section cover the rapid diagnosis of people who have had sudden onset of symptoms that are indicative of stroke and TIA. How to identify risk of subsequent stroke in people who have had a TIA is also covered.

Prompt Recognition of Symptoms of Stroke and TIA

In people with sudden onset of neurological symptoms a validated tool, such as FAST (Face Arm Speech Test), should be used outside hospital to screen for a diagnosis of stroke or TIA.

In people with sudden onset of neurological symptoms, hypoglycaemia should be excluded as the cause of these symptoms.

People who are admitted to accident and emergency (A&E) with a suspected stroke or TIA should have the diagnosis established rapidly using a validated tool, such as ROSIER (Recognition of Stroke in the Emergency Room).

Assessment of People Who Have Had a Suspected TIA, and Identifying Those at High Risk of Stroke

People who have had a suspected TIA (that is, they have no neurological symptoms at the time of assessment [within 24 hours]) should be assessed as soon as possible for their risk of subsequent stroke using a validated scoring system, such as $ABCD^2$. (These scoring systems exclude certain populations that may be at particularly high risk of stroke, such as those with recurrent TIAs and those on anticoagulation treatment, who also need urgent evaluation. They also may not be relevant to patients who present late.)

People who have had a suspected TIA who are at high risk of stroke (that is, with an $ABCD^2$ score of 4 or above) should have:

- Aspirin (300 mg daily) started immediately
- Specialist assessment (includes exclusion of stroke mimics, identification of vascular treatment, identification of likely causes, and appropriate investigation and treatment) and investigation within 24 hours of onset of symptom
- Measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors

People with crescendo TIA (two or more TIAs in a week) should be treated as being at high risk of stroke, even though they may have an $ABCD^2$ score of 3 or below.

People who have had a suspected TIA who are at lower risk of stroke (that is, an $ABCD^2$ score of 3 or below) should have:

- Aspirin (300 mg daily) started immediately
- Specialist assessment (includes exclusion of stroke mimics, identification of vascular treatment, identification of likely causes, and appropriate investigation and treatment) and investigation as soon as possible, but definitely within 1 week of onset of symptoms
- Measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors.

People who have had a TIA but who present late (more than 1 week after their last symptom has resolved) should be treated as though they are at lower risk of stroke.

Imaging in People Who Have Had a Suspected TIA or Non-Disabling Stroke

While all people with symptoms of acute stroke need urgent brain scanning, there is less evidence to recommend brain scanning in those people whose symptoms have completely resolved by the time of assessment. This section contains recommendations about which people with suspected TIA need brain imaging and the type of imaging that is most helpful.

Some people who have had a stroke or TIA have narrowing of the carotid artery that may require surgical intervention. Carotid imaging is required to define the extent of carotid artery narrowing. The optimum timing of carotid imaging, and the selection of appropriate patients for, and timing of, carotid endarterectomy are covered below under "Early Carotid Imaging in People with Acute Non-Disabling Stroke or TIA" and "Urgent Carotid Endarterectomy And Carotid Stenting." The use of carotid stenting was also reviewed by the Guideline Development Group (GDG). However, no evidence for early carotid stenting was found on which the GDG felt they could base a recommendation. For more information, see chapter 6 of the full guideline [see the "Availability of Companion Documents" field].

Suspected TIA — Referral for Urgent Brain Imaging

People who have had a suspected TIA (that is, whose symptoms and signs have completely resolved within 24 hours) should be assessed by a specialist (within 1 week of symptom onset) before a decision on brain imaging is made.

People who have had a suspected TIA who are at high risk of stroke (for example, an $ABCD^2$ score of 4 or above, or with crescendo TIA) in whom the vascular territory or pathology is uncertain* should undergo urgent brain imaging (preferably diffusion-weighted magnetic resonance imaging [MRI]). (The GDG felt that urgent brain imaging is defined as imaging that takes place 'within 24 hours of onset of symptoms'. This is in line with the National Stroke Strategy.)

People who have had a suspected TIA who are at lower risk of stroke (for example, an $ABCD^2$ score of less than 4) in whom the vascular territory or pathology is uncertain* should undergo brain imaging (preferably diffusion-weighted MRI). (The GDG felt that brain imaging in people with a lower risk of stroke should take place 'within 1 week of onset of symptoms'. This is in line with the National Stroke Strategy.)

*Examples where brain imaging is helpful in the management of TIA are:

> People being considered for carotid endarterectomy where it is uncertain whether the stroke is in the anterior or posterior circulation
> People with TIA where hemorrhage needs to be excluded, for example long duration of symptoms or people on anticoagulants
> Where an alternative diagnosis (for example migraine, epilepsy or tumor) is being considered

Type of Brain Imaging for People with Suspected TIA

People who have had a suspected TIA who need brain imaging (that is, those in whom vascular territory or pathology is uncertain) should undergo diffusion-weighted MRI except where contraindicated, in which case CT (computed tomography) scanning should be used. (Contraindications to MRI include people who have any of the following: a pacemaker, shrapnel, some brain aneurysm clips and heart valves, metal fragments in eyes, severe claustrophobia.)

Early Carotid Imaging in People with Acute Non-Disabling Stroke or TIA

All people with suspected non-disabling stroke or TIA who after specialist assessment are considered as candidates for carotid endarterectomy should have carotid imaging within 1 week of onset of symptoms. People who present more than 1 week after their last symptom of TIA has resolved should be managed using the lower-risk pathway.

Urgent Carotid Endarterectomy and Carotid Stenting

People with stable neurological symptoms from acute non-disabling stroke or TIA who have symptomatic carotid stenosis of 50%-99% according to the NASCET (North American Symptomatic Carotid Endarterectomy Trial) criteria, or 70–99% according to the ECST (European Carotid Surgery Trialists' Collaborative Group) criteria, should:

- Be assessed and referred for carotid endarterectomy within 1 week of onset of stroke or TIA symptoms
- Undergo surgery within a maximum of 2 weeks of onset of stroke or TIA symptoms
- Receive best medical treatment (control of blood pressure, antiplatelet agents, cholesterol lowering through diet and drugs, lifestyle advice).

People with stable neurological symptoms from acute non-disabling stroke or TIA who have symptomatic carotid stenosis of less than 50% according to the NASCET criteria, or less than 70% according to the ECST criteria, should:

- Not undergo surgery
- Receive best medical treatment (control of blood pressure, antiplatelet agents, cholesterol lowering through diet and drugs, lifestyle advice)

Carotid imaging reports should clearly state which criteria (ECST or NASCET) were used when measuring the extent of carotid stenosis.

Specialist Care for People with Acute Stroke

This section provides recommendations about the optimum care for people with acute stroke: where they should be cared for and how soon they should undergo brain imaging.

Specialist Stroke Units

All people with suspected stroke should be admitted directly to a specialist acute stroke unit following initial assessment, either from the community or from the A&E department. (An acute stroke unit is a discrete area in the hospital that is staffed by a specialist stroke multidisciplinary team. It has access to equipment for monitoring and rehabilitating patients. Regular multidisciplinary team meetings occur for goal setting).

Brain Imaging for the Early Assessment of People with Acute Stroke

Brain imaging should be performed immediately for people with acute stroke if any of the following apply (The GDG felt that 'immediately' is defined as 'ideally the next slot and definitely within 1 hour, whichever is sooner', in line with the National Stroke Strategy):

- Indications for thrombolysis or early anticoagulation treatment
- On anticoagulant treatment
- A known bleeding tendency
- A depressed level of consciousness (Glasgow Coma Score below 13)
- Unexplained progressive or fluctuating symptoms
- Papilloedema, neck stiffness or fever
- Severe headache at onset of stroke symptoms

For all people with acute stroke without indications for immediate brain imaging, scanning should be performed as soon as possible. (The GDG felt that 'as soon as possible' is defined as 'within a maximum of 24 hours after onset of symptoms'.)

Pharmacological Treatments for People with Acute Stroke

Urgent treatment has been shown to improve outcome in stroke. This section contains recommendations about urgent pharmacological treatment in people with acute stroke.

Thrombolysis with Alteplase

Alteplase is recommended for the treatment of acute ischaemic stroke when used by physicians trained and experienced in the management of acute stroke. It should only be administered in centres with facilities that enable it to be used in full accordance with its marketing authorization.

Alteplase should be administered only within a well organized stroke service with:

- Staff trained in delivering thrombolysis and in monitoring for any complications associated with thrombolysis
- Level 1 and level 2 nursing care staff trained in acute stroke and thrombolysis (See NHS Data Dictionary , 'Critical care level' [online]).
- Immediate access to imaging and re-imaging, and staff trained to interpret the images.

Staff in A&E departments, if appropriately trained and supported, can administer alteplase (in accordance with its marketing authorization) for the treatment of acute ischaemic stroke provided that patients can be managed within an acute stroke service with appropriate neuroradiological and stroke physician support.

Protocols should be in place for the delivery and management of thrombolysis, including post-thrombolysis complications.

Aspirin and Anticoagulant Treatment

People with Acute Ischaemic Stroke

All people presenting with acute stroke who have had a diagnosis of primary intracerebral haemorrhage excluded by brain imaging should, as soon as possible but certainly within 24 hours, be given:

- Aspirin 300 mg orally if they are not dysphagic
- Aspirin 300 mg rectally or by enteral tube if they are dysphagic

Thereafter, aspirin 300 mg should be continued until 2 weeks after the onset of stroke symptoms, at which time definitive long-term antithrombotic treatment should be initiated. People being discharged before 2 weeks can be started on long-term treatment earlier.

Any person with acute ischaemic stroke for whom previous dyspepsia associated with aspirin is reported should be given a proton pump inhibitor in addition to aspirin.

Any person with acute ischaemic stroke who is allergic to or genuinely intolerant of aspirin* should be given an alternative antiplatelet agent.

*Note: Aspirin intolerance is defined in the NICE technology appraisal guidance 90, 'Clopidogrel and modified-release dipyridamole in the prevention of occlusive vascular events,' as either of the following:

Proven hypersensitivity to aspirin-containing medicines
History of severe dyspepsia induced by low-dose aspirin

Anticoagulation treatment should not be used routinely for the treatment of acute stroke. (There may be a subgroup of people for whom the risk of venous thromboembolism outweighs the risk of haemorrhagic transformation. People considered to be at particularly high risk of venous thromboembolism include anyone with complete paralysis of the leg, a previous history of venous thromboembolism, dehydration or comorbidities [such as malignant disease], or who is a current or recent smoker. Such people should be kept under regular review if they are given prophylactic anticoagulation. Further details are included in the NICE clinical guideline CG92, 'Venous thromboembolism: reducing the risk').

People with Acute Venous Stroke

People diagnosed with cerebral venous sinus thrombosis (including those with secondary cerebral haemorrhage) should be given full-dose anticoagulation treatment (initially full-dose heparin and then warfarin [international normalized ratio (INR) 2–3]) unless there are comorbidities that preclude its use.

People with Stroke Associated with Arterial Dissection

People with stroke secondary to acute arterial dissection should be treated with either anticoagulants or antiplatelet agents, preferably as part of a randomised controlled trial to compare the effects of the two treatments.

People with Acute Ischaemic Stroke Associated with Antiphospholipid Syndrome

People with antiphospholipid syndrome who have an acute ischaemic stroke should be managed in same way as people with acute ischaemic

stroke without antiphospholipid syndrome. (There was insufficient evidence to support any recommendation on the safety and efficacy of anticoagulants versus antiplatelets for the treatment of people with acute ischaemic stroke associated with antiphospholipid syndrome.)

Reversal of Anticoagulation Treatment in People with Hemorrhagic Stroke

Clotting levels in people with a primary intracerebral hemorrhage who were receiving anticoagulation treatment before their stroke (and have elevated INR) should be returned to normal as soon as possible, by reversing the effects of the anticoagulation treatment using a combination of prothrombin complex concentrate and intravenous vitamin K.

Anticoagulation Treatment for Other Comorbidities

People with disabling ischaemic stroke who are in atrial fibrillation should be treated with aspirin 300 mg for the first 2 weeks before considering anticoagulation treatment.

In people with prosthetic valves who have disabling cerebral infarction and who are at significant risk of haemorrhagic transformation, anticoagulation treatment should be stopped for 1 week and aspirin 300 mg substituted.

People with ischaemic stroke and symptomatic proximal deep vein thrombosis or pulmonary embolism should receive anticoagulation treatment in preference to treatment with aspirin unless there are other contraindications to anticoagulation.

People with haemorrhagic stroke and symptomatic deep vein thrombosis or pulmonary embolism should have treatment to prevent the development of further pulmonary emboli using either anticoagulation or a caval filter.

Statin Treatment

Immediate initiation of statin treatment is not recommended in people with acute stroke. (The consensus of the GDG is that it would be safe to start statins after 48 hours.)

People with acute stroke who are already receiving statins should continue their statin treatment.

Maintenance or Restoration of Homeostasis

A key element of care for people with acute stroke is the maintenance of cerebral blood flow and oxygenation to prevent further brain damage after stroke. This section contains recommendations on oxygen supplementation, maintenance of normoglycaemia, and acute blood pressure manipulation.

Supplemental Oxygen Therapy

People who have had a stroke should receive supplemental oxygen only if their oxygen saturation drops below 95%. The routine use of supplemental oxygen is not recommended in people with acute stroke who are not hypoxic.

Blood Sugar Control

People with acute stroke should be treated to maintain a blood glucose concentration between 4 and 11 mmol/litre.

Optimal insulin therapy, which can be achieved by the use of intravenous insulin and glucose, should be provided to all adults with diabetes who have threatened or actual myocardial infarction or stroke. Critical care and emergency departments should have a protocol for such management. (Note: This recommendation is from 'Type 1 diabetes: diagnosis and management of type 1 diabetes in children, young people and adults' [NICE clinical guideline 15]).

Blood Pressure Control

Anti-hypertensive treatment in people with acute stroke is recommended only if there is a hypertensive emergency with one or more of the following serious concomitant medical issues:

- Hypertensive encephalopathy
- Hypertensive nephropathy
- Hypertensive cardiac failure/myocardial infarction
- Aortic dissection
- Pre-eclampsia/eclampsia
- Intracerebral haemorrhage with systolic blood pressure over 200 mmHg

Blood pressure reduction to 185/110 mmHg or lower should be considered in people who are candidates for thrombolysis.

Nutrition and Hydration

Many people with acute stroke are unable to swallow safely, and may require supplemental hydration and nutrition. This section provides recommendations on assessment of swallowing, hydration and nutrition.

Assessment of Swallowing Function

On admission, people with acute stroke should have their swallowing screened by an appropriately trained healthcare professional before being given any oral food, fluid or medication.

If the admission screen indicates problems with swallowing, the person should have a specialist assessment of swallowing, preferably within 24 hours of admission and not more than 72 hours afterwards.

People with suspected aspiration on specialist assessment, or who require tube feeding or dietary modification for 3 days, should be:

- Re-assessed and considered for instrumental examination
- Referred for dietary advice

People with acute stroke who are unable to take adequate nutrition and fluids orally should:

- Receive tube feeding with a nasogastric tube within 24 hours of admission
- Be considered for a nasal bridle tube or gastrostomy if they are unable to tolerate a nasogastric tube
- Be referred to an appropriately trained healthcare professional for detailed nutritional assessment, individualised advice and monitoring

Oral Nutritional Supplementation

All hospital inpatients on admission should be screened for malnutrition and the risk of malnutrition. Screening should be repeated weekly for inpatients. (This recommendation is adapted from NICE clinical guideline 32, Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition).

Screening should assess body mass index (BMI) and percentage unintentional weight loss and should also consider the time over which nutrient intake has been unintentionally reduced and/or the likelihood of future impaired nutrient intake. The Malnutrition Universal Screening Tool (MUST), for example, may be used to do this. (This recommendation is from NICE clinical guideline 32, Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition).

When screening for malnutrition and the risk of malnutrition, healthcare professionals should be aware that dysphagia, poor oral health and reduced ability to self-feed will affect nutrition in people with stroke.

Screening for malnutrition and the risk of malnutrition should be carried out by healthcare professionals with appropriate skills and training. (This recommendation is from NICE clinical guideline 32, Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition .)

Routine nutritional supplementation is not recommended for people with acute stroke who are adequately nourished on admission.

Nutrition support should be initiated for people with stroke who are at risk of malnutrition. This may include oral nutritional supplements, specialist dietary advice and/or tube feeding.

All people with acute stroke should have their hydration assessed on admission, reviewed regularly and managed so that normal hydration is maintained.

Early Mobilization and Optimum Positioning of People with Acute Stroke

Early mobilisation is considered a key element of acute stroke care. Sitting up will help to maintain oxygen saturation and reduce the likelihood of hypostatic pneumonia.

- People with acute stroke should be mobilised as soon as possible (when their clinical condition permits) as part of an active management programme in a specialist stroke unit.
- People with acute stroke should be helped to sit up as soon as possible (when their clinical condition permits).

Avoidance of Aspiration Pneumonia

Aspiration pneumonia is a complication of stroke that is associated with increased mortality and poor outcomes.

- In people with dysphagia, food and fluids should be given in a form that can be swallowed without aspiration, following specialist assessment of swallowing.

Surgery for People with Acute Stroke

There is evidence that neurosurgical treatment may be indicated for a very small number of carefully selected people with stroke. This section contains recommendations for surgical intervention in people with intracerebral haemorrhage or severe middle cerebral artery infarction.

Surgical Referral for Acute Intracerebral Hemorrhage

Stroke services should agree protocols for the monitoring, referral and transfer of people to regional neurosurgical centres for the management of symptomatic hydrocephalus.

People with intracranial hemorrhage should be monitored by specialists in neurosurgical or stroke care for deterioration in function and referred immediately for brain imaging when necessary.

Previously fit people should be considered for surgical intervention following primary intracranial hemorrhage if they have hydrocephalus.

People with any of the following rarely require surgical intervention and should receive medical treatment initially:

- Small deep haemorrhages
- Lobar haemorrhage without either hydrocephalus or rapid neurological deterioration
- A large haemorrhage and significant comorbidities before the stroke
- A score on the Glasgow Coma Scale of below 8 unless this is because of hydrocephalus
- Posterior fossa haemorrhage

Surgical Referral for Decompressive Hemicraniectomy

People with middle cerebral artery infarction who meet all of the criteria below should be considered for decompressive hemicraniectomy. They should be referred within 24 hours of onset of symptoms and treated within a maximum of 48 hours.

- Aged 60 years or under
- Clinical deficits suggestive of infarction in the territory of the middle cerebral artery, with a score on the National Institutes of Health Stroke Scale (NIHSS) of above 15
- Decrease in the level of consciousness to give a score of 1 or more on item 1a of the NIHSS
- Signs on computed tomography (CT) of an infarct of at least 50% of the middle cerebral artery territory, with or without additional infarction in the territory of the anterior or posterior cerebral artery on the same side, or infarct volume greater than 145 cm^3 as shown on diffusion-weighted MRI

People who are referred for decompressive hemicraniectomy should be monitored by appropriately trained professionals skilled in neurological assessment.

Clinical Algorithm(s)

The following algorithms are providedÂ as separate filesÂ of the original guideline document:

A transient ischaemic attack (TIA) pathway (algorithm 1)
AÂ stroke pathway (algorithm 2)

Scope

Disease/Condition(s)

Acute stroke and transient ischaemic attack (TIA)

Guideline Category

Diagnosis

Evaluation

Management

Risk Assessment

Treatment

Clinical Specialty

Critical Care

Emergency Medicine

Internal Medicine

Neurological Surgery

Neurology

Radiology

Intended Users

Advanced Practice Nurses

Health Care Providers

Nurses

Occupational Therapists

Patients

Physical Therapists

Physicians

Speech-Language Pathologists

Guideline Objective(s)

To provide a user-friendly, clinical, evidence-based guideline for the National Health Service (NHS) that:

- Offers best clinical advice for the diagnosis and acute management of stroke and transient ischaemic attack (TIA)
- Is based on best published clinical and economic evidence, alongside expert consensus
- Takes into account patient choice and informed decision-making
- Defines the major components of NHS care provision for the management of acute stroke and TIA
- Details areas of uncertainty or controversy requiring further research
- Provides a choice of guideline versions for differing audiences

Target Population

People with transient ischaemic attacks (TIAs) or completed strokes; that is, an acute neurological event presumed to be vascular in origin and

causing cerebral ischaemia, cerebral infarction or cerebral haemorrhage.

This includes:

- First and recurrent events
- Thrombotic and embolic events
- Primary intracerebral haemorrhage of any cause, including venous thrombosis

Groups that are not covered:

- People with subarachnoid haemorrhage
- Children (aged 16 years and under)

Interventions and Practices Considered

Diagnosis/Evaluation/Risk Assessment

- Prompt recognition of symptoms of stroke and transient ischemic attack (TIA) using validated tools such as FAST (Face Arm Speech Test) or ROSIER (Recognition of Stroke in the Emergency Room)
- Assessment of people with suspected TIA for risk of subsequent stroke using a validated scoring system such as $ABCD^2$
- Brain imaging (diffusion-weighted magnetic resonance imaging or computed tomography)
- Carotid imaging
- Specialist assessment and investigation within 24 hours of symptom onset

Management/Treatment

- Immediate aspirin treatment in patients with suspected TIA
- Measures for secondary prevention in patients with confirmed TIA
- Urgent carotid endarterectomy and carotid stenting
- Admission to specialist stroke units for people with acute stroke
- Pharmacological treatment for people with acute stroke
  - Alteplase for thrombolysis
  - Aspirin
  - Anticoagulation (not recommended routinely)
  - Statins (not recommended routinely)
- Supplemental oxygen therapy
- Blood sugar control
- Blood pressure control
- Assessment of swallowing function and avoidance of aspiration pneumonia
- Nasogastric intubation when indicated
- Screening for malnutrition and nutritional support when indicated
- Early mobilization and optimum positioning of people with acute stroke
- Referral for surgery in people with intracerebral hemorrhage or severe middle cerebral artery infarction

Major Outcomes Considered

- Incidence of stroke after transient ischemic attack or minor stroke
- Accuracy (sensitivity, specificity) of diagnostic imaging and assessment tools for stroke Â
- Stroke-related health status (dependence, independence)
- Effectiveness of treatment in terms of recovery time, morbidity, mortality, length of hospital stay
- Quality of life
- Adverse effects
- Cost-effectiveness

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Collaborating Centre for Chronic Conditions (NCC-CC) on behalf of the National Institute for Health and Clinical Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance.

Searching for the Evidence

The information scientist developed a search strategy for each question. Key words for the search were identified by the Guideline Development Group (GDG). In addition, the health economist searched for additional papers providing economic evidence or to inform detailed health economic work (for example, modelling). Papers that were published or accepted for publication in peer-reviewed journals were considered as evidence by the GDG. Conference paper abstracts and non-English language papers were excluded from the searches.

Each clinical question dictated the appropriate study design that was prioritized in the search strategy but the strategy was not limited solely to these study types. The research fellow or health economist identified titles and abstracts from the search results that appeared to be relevant to the question. Exclusion lists, generated for each question together with the rationale for the exclusion, were presented to the GDG. Full papers were obtained where relevant. See Appendix A in the full version of original guideline, available from the Royal College of Physicians Web site for literature search details.

Currency Review

The National Clinical Guidelines Centre for Acute and Chronic Conditions undertook a review of this guideline in 2011 and determined that the information is current. See the NICE Web site for the review decision.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Level of Evidence

1++: High-quality meta-analyses, systematic reviews of randomised controlled trials (RCTs) or RCTs with a very low risk of bias

1+: Well-conducted meta-analyses, systematic reviews of RCTs or RCTs with a low risk of bias

1-: Meta-analyses, systematic reviews of RCTs or RCTs with a high risk of bias

2++: High-quality systematic reviews of caseâ€“control or cohort studies; high-quality caseâ€“control or cohort studies with a very low risk of

confounding, bias or chance and a high probability that the relationship is causal

2+: Well-conducted caseâ€“control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal

2-: Caseâ€“control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal*

3: Non-analytical studies (for example case reports, case series)

4: Expert opinion, formal consensus

*Studies with a level of evidence '-' are not used as a basis for making a recommendation.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Collaborating Centre for Chronic Conditions on behalf of the National Institute for Health and Clinical Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance.

Appraising the Evidence

The research fellow or health economist, as appropriate, critically appraised the full papers. In general, no formal contact was made with authors. However, there were ad hoc occasions when this was required in order to clarify specific details. Critical appraisal checklists were compiled for each full paper. One research fellow undertook the critical appraisal and data extraction. The evidence was considered carefully by the Guideline Development Group (GDG) for accuracy and completeness.

All procedures are fully compliant with the:

> NICE methodology as detailed in the 'Guideline development methods â€“ information for national collaborating centres and guideline developers' manual' 2007 (see the "Availability of Companion Documents" field).
> NCC-CC quality assurance document and systematic review chart available from the Royal College of Physicians Web site .

Health Economic Evidence

Areas for health economic modelling were agreed by the GDG after the formation of the clinical questions. The health economist reviewed the clinical questions to consider the potential application of health economic modelling, and these priorities were agreed with the GDG.

The health economist performed supplemental literature searches to obtain additional data for modelling. Assumptions and designs of the models were explained to and agreed by the GDG members during meetings, and they commented on subsequent revisions.

Distilling and Synthesizing the Evidence and Developing Recommendations

The evidence from each full paper was distilled into an evidence table and synthesised into evidence statements before being presented to the GDG. This evidence was then reviewed by the GDG and used as a basis upon which to formulate recommendations. The criteria for grading evidence are shown in the "Rating Scheme for the Strength of the Evidence" field of this summary.

Evidence tables are available from the Royal College of Physicians Web site .

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Collaborating Centre for Chronic Conditions on behalf of the National Institute for Health and Clinical Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance.

The Guideline Development Group (GDG)

The GDG met monthly (November 2006 to November 2007) and comprised a multidisciplinary team of professionals and people with experience of acute stroke or transient ischaemic attack (TIA) who were supported by the technical team.

The GDG membership details including patient representation and professional groups are detailed in the GDG membership table at the front of the full version of the original guideline document.

Agreeing the Recommendations

The GDG employed formal consensus techniques to:

- Ensure that the recommendations reflected the evidence base
- Approve recommendations based on lesser evidence or extrapolations from other situations
- Reach consensus recommendations where the evidence was inadequate
- Debate areas of disagreement and finalize recommendations

The GDG reached agreement on the following:

- Six recommendations as key priorities for implementation
- Six key research recommendations
- Algorithms

In prioritizing key recommendations for implementation, the GDG took into account the following criteria:

- High clinical impact
- High impact on reducing variation
- More efficient use of National Health Service resources
- Allowing the patient to reach critical points in the care pathway more quickly

Audit criteria for this guideline will be produced by NICE, following publication, in order to provide suggestions of areas for audit in line with the key recommendations for implementation.

Writing the Guideline

The first draft version of the guideline was drawn up by the technical team in accord with the decisions of the GDG, incorporating contributions from individual GDG members in their expert areas and edited for consistency of style and terminology.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

The reader should refer to the "Health Economics" sections of the full version of the original guideline document, which present, where appropriate, an overview of the cost effectiveness of the evidence base or any economic modelling performed for particular interventions and practices. In addition, Appendix C of the full version of the original guideline provides details on the economic model to determine the cost effectiveness of immediate specialist assessment in a stroke unit compared to specialist assessment at a weekly clinic or no specialist assessment (see Royal College of Physicians Web site).

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

The guideline was validated through two consultations.

1. The first draft of the guideline (The full guideline, National Institute for Clinical Excellence [NICE] guideline and Quick Reference Guide) were consulted with Stakeholders and comments were considered by the Guideline Development Group (GDG).
2. The final consultation draft of the full guideline, the NICE guideline and the Information for the Public were submitted to stakeholders for final comments.

The final draft was submitted to the Guideline Review Panel for review prior to publication.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

Recommendations are based on clinical and cost effectiveness evidence, and where this is insufficient, the Guideline Development Group (GDG) used all available information sources and experience to make consensus recommendations using formal consensus technique.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate diagnosis and management of patients with acute stroke and transient ischaemic attack (TIA)

Potential Harms

Adverse effects of pharmacological therapy
Complications of surgical interventions

Contraindications

Contraindications

Contraindications to magnetic resonance imaging (MRI) include people who have any of the following: a pacemaker, shrapnel, some brain aneurysm clips and heart valves, metal fragments in eyes, severe claustrophobia.

Qualifying Statements

Qualifying Statements

- This guidance represents the view of the National Institute of Clinical ExcellenceÂ (NICE), which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the

circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

- Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.
- Healthcare providers need to use clinical judgement, knowledge and expertise when deciding whether it is appropriate to apply guidelines. The recommendations cited here are a guide and may not be appropriate for use in all situations. The decision to adopt any of the recommendations cited here must be made by the practitioner in light of individual patient circumstances, the wishes of the patient, clinical expertise and resources. The National Collaborating Centre for Chronic Conditions (NCC-CC) disclaims any responsibility for damages arising out of the use or non-use of these guidelines and the literature used in support of these guidelines.

Implementation of the Guideline

Description of Implementation Strategy

The Healthcare Commission assesses the performance of National Health Service (NHS) organisations in meeting core and developmental standards set by the Department of Health in 'Standards for better health' (available from http://www.dh.gov.uk/). Implementation of clinical guidelines forms part of the developmental standard D2. Core standard C5 says that national agreed guidance should be taken into account when NHS organisations are planning and delivering care.

The National Institute for Health and Clinical Excellence (NICE) has developed tools to help organisations implement this guidance (listed below). These are available on the NICE website (http://guidance.nice.org.uk/CG68 ; see also the "Availability of Companion Documents" field).

- Slides highlighting key messages for local discussion
- Costing tools:
  - Costing report to estimate the national savings and costs associated with implementation
  - Costing template to estimate the local costs and savings involved
- Audit support for monitoring local practice

Key Priorities for Implementation

Rapid Recognition of Symptoms and Diagnosis

- In people with sudden onset of neurological symptoms a validated tool, such as FAST (Face Arm Speech Test), should be used outside hospital to screen for a diagnosis of stroke or transient ischaemic attack (TIA).
- People who have had a suspected TIA who are at high risk of stroke (that is, with an $ABCD^2$ score of 4 or above) should have:
  - Aspirin (300 mg daily) started immediately
  - Specialist assessment and investigation within 24 hours of onset of symptoms (Specialist assessment includes exclusion of stroke mimics, identification of vascular treatment, identification of likely causes, and appropriate investigation and treatment.)
  - Measures for secondary prevention introduced as soon as the diagnosis is confirmed, including discussion of individual risk factors.
- People with crescendo TIA (two or more TIAs in a week) should be treated as being at high risk of stroke, even though they may have an $ABCD^2$ score of 3 or below.

Specialist Care for People with Acute Stroke

- All people with suspected stroke should be admitted directly to a specialist acute stroke unit following initial assessment, either from the community or from the accident and emergency (A&E) department. (An acute stroke unit is a discrete area in the hospital that is staffed by a specialist stroke multidisciplinary team. It has access to equipment for monitoring and rehabilitating patients. Regular multidisciplinary team meetings occur for goal setting.)
- Brain imaging should be performed immediately for people with acute stroke if any of the following apply (The Guideline Development Group felt that 'immediately' is defined as 'ideally the next slot and definitely within 1 hour, whichever is sooner', in line with the National Stroke Strategy.):

- Indications for thrombolysis or early anticoagulation treatment
- On anticoagulant treatment
- A known bleeding tendency
- A depressed level of consciousness (Glasgow Coma Score below 13)
- Unexplained progressive or fluctuating symptoms
- Papilloedema, neck stiffness or fever
- Severe headache at onset of stroke symptoms

Nutrition and Hydration

- On admission, people with acute stroke should have their swallowing screened by an appropriately trained healthcare professional before being given any oral food, fluid or medication.

Implementation Tools

Audit Criteria/Indicators

Clinical Algorithm

Patient Resources

Quick Reference Guides/Physician Guides

Resources

Slide Presentation

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Patient-centeredness

Timeliness

Identifying Information and Availability

Bibliographic Source(s)

National Collaborating Centre for Chronic Conditions. Stroke. Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA). London (UK): National Institute for Health and Clinical Excellence (NICE); 2008 Jul. 37 p. (Clinical guideline; no. 68).

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2008 Jul (reaffirmed 2011)

Guideline Developer(s)

National Clinical Guideline Centre for Acute and Chronic Conditions - National Government Agency [Non-U.S.]

Source(s) of Funding

National Institute for Health and Clinical Excellence (NICE)

Guideline Committee

Guideline Development Group

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Financial Disclosures/Conflicts of Interest

Members of the Guideline Development Group declared any interests in accordance with the National Institute for Health and Clinical Excellence (NICE) technical manual (see "Availability of Companion Documents" field). A register is given in Appendix D of the full version of the original guideline document, available from the Royal College of Physicians Web site .

Guideline Status

This is the current release of the guideline.

The National Clinical Guideline Centre for Acute and Chronic Conditions reaffirmed the currency of this guideline in 2011.

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the National Institute for Health and Clinical Excellence (NICE) Web site

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Availability of Companion Documents

The following are available:

- Stroke. Full guideline. London (UK): National Institute for Health and Clinical Excellence (NICE); 2008 Jul. 37 p. (Clinical guideline; no. 68). Electronic copies: Available in Portable Document Format (PDF) format from the National Institute for Health and Clinical Excellence (NICE) Web site .
- Stroke: algorithm 1 (TIA pathway). London (UK): National Institute for Health and Clinical Excellence (NICE); 2008 Jul. 1 p. (Clinical guideline; no. 68). Electronic copies: Available in Portable Document Format (PDF) format from the NICE Web site .
- Stroke: algorithm 2 (stroke pathway). London (UK): National Institute for Health and Clinical Excellence (NICE); 2008 Jul. 1 p. (Clinical guideline; no. 68). Electronic copies: Available in Portable Document Format (PDF) format from the NICE Web site .
- Stroke: diagnosis and initial management of acute stroke and transient ischaemic attack (TIA). Quick reference guide. London (UK): National Institute for Health and Clinical Excellence; 2008 Jul. 16 p. (Clinical guideline; no. 68). Electronic copies: Available in Portable Document Format (PDF) from the NICE Web site .
- Stroke: diagnosis and initial management of acute stroke and transient ischaemic attack (TIA). Audit support. London (UK): National Institute for Health and Clinical Excellence; 2008 Jul. 8 p. (Clinical guideline; no. 68). Electronic copies: Available in Portable Document Format (PDF) from the NICE Web site .
- Stroke: diagnosis and initial management of acute stroke and transient ischaemic attack (TIA). Costing report. Implementing NICE guidance. London (UK): National Institute for Health and Clinical Excellence; 2008 Jul. 38 p. (Clinical guideline; no. 68). Electronic copies: Available in Portable Document Format (PDF) from the NICE Web site .
- Stroke. Costing template. London (UK): National Institute for Health and Clinical Excellence; 2008 Jul. Various p. (Clinical guideline; no. 68). Electronic copies: Available from the NICE Web site .
- Stroke. Implementing NICE guidance. Slide set. London (UK): National Institute for Health and Clinical Excellence; 2008. 14 p. (Clinical guideline; no. 68). Electronic copies: Available from the NICE Web site .
- The guidelines manual 2007. London (UK): National Institute for Health and Clinical Excellence (NICE); 2007 April. Electronic copies: Available in Portable Document Format (PDF) from the NICE Archive Web site .

Patient Resources

The following is available:

- Early assessment and treatment of people who have had a stroke or transient ischaemic attack (TIA). Understanding NICE guidance - Information for people who use NHS services. London (UK): National Institute for Health and Clinical Excellence; 2008 Jul. 16 p. (Clinical guideline; no. 68). Electronic copies: Available in Portable Document Format (PDF) from the National Institute for Health and Clinical Excellence (NICE) Web site .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This summary was completed by ECRI Institute on February 19, 2010. This summary was updated by ECRI Institute on May 17, 2010 following the U.S. Food and Drug Administration advisory on Plavix (clopidogrel). This summary was updated by ECRI Institute on July 26, 2010 following

the U.S. Food and Drug Administration (FDA) advisory on Proton Pump Inhibitors (PPI). This summary was updated by ECRI Institute on July 27, 2010 following the FDA drug safety communication on Heparin. This summary was updated by ECRI Institute on June 27, 2011 following the U.S. Food and Drug Administration advisory on Zocor (simvastatin). This summary was updated by ECRI Institute on April 13, 2012 following the U.S. Food and Drug Administration advisories on Statin Drugs and Statins and HIV or Hepatitis C drug. The currency of the guideline was reaffirmed by the developer in 2011 and this summary was updated by ECRI Institute on November 1, 2013. This summary was updated by ECRI Institute on March 10, 2014 following the U.S. Food and Drug Administration advisory on Low Molecular Weight Heparins.

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